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ABSTRACT

High school administrators in sparsely populated rural areas are showing great interest in interactive satellite instruction as a way to resolve teacher shortages and meet rigorous state graduation requirements. Televised classes permitting live teacher/student interaction via satellite communication systems and regular telephone lines provide equity and increase quality of educational opportunity, provide access to subject matter experts/career role models not available in local communities, provide interaction with students in other schools, increase access to information/instructional resources, offer opportunities for staff development/inservice training, and increase school/community linkages. Four interactive instructional television satellite systems currently operate in the United States: the TI-IN Network from San Antonio, Texas, Oklahoma State University's Arts and Sciences Teleconferencing Service, Utah State Department of Education's system, and Eastern Washington University's Telecommunication Project. The rapid growth of these four satellite networks has generated interest by many state officials in statewide satellite networks. Kentucky and Missouri are the first states to establish networks to broadcast elementary/secondary, staff development, college credit, adult education, and community education courses. Characteristics of the satellite systems are described and addresses for further information about the systems are provided. (LFL)

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# THE EFFECTS OF LEARNING BY SATELLITE ON RURAL SCHOOLS

When colleges and universities began offering instruction over television and videotape some 10 - 15 years ago, few high schools followed suit. Equipment was cost prohibitive and live teacher/student interaction was not possible. Today's technology, made possible largely through satellite telecommunications, has changed all that. There are now over 100 communications satellites in service around the world -- more than 20 servicing the United States alone (Rosenzweig, 1986). The satellite's ability to provide simultaneous, reliable, and high quality full motion viewing and clear audio listening has changed dramatically our ability to transmit and receive information. When coupled with audio talk-back capabilities over regular telephone lines, satellite communication systems permit live audio interaction between the uplink site and the downlink site locations. The result is interactive communication (one-way video, two-way audio interaction).

## Interactive Satellite Instruction:

Educators across the nation -- especially high school administrators in sparsely populated rural areas -- are showing great interest in this approach to "distance learning." Teachers today are in short supply and most states are mandating rigorous graduation requirements. If students attending geographically isolated schools are to

benefit from state instituted educational reforms, it will at least to some degree have to be by "long distance." Today, televised classes which permit live teacher/student interaction are perhaps the biggest educational breakthrough since the computer.

Currently four interactive instructional television satellite systems are beaming instruction to high school students scattered throughout the continental United States (Barker, 1987). These are (1) the TI-IN Network uplinking out of San Antonio, Texas; (2) Oklahoma State University's Arts and Sciences Teleconferencing Service; (3) the Accelerated Learning of Spanish Program sponsored by the Utah State Office of Education; and (4) Eastern Washington University's Telecommunication Project: The largest system, the TI-IN Network, operates out of Texas. At the close of the 1986-87 school year, TI-IN was beaming lessons for 23 different high school credit courses five days each week to over 200 subscribing high schools in 14 different states. In addition, the network beams extensive inservice training for teachers, enrichment programs for students across the K-12 curriculum, and selected college credit courses.

The second largest satellite network is comprised of schools subscribing to Oklahoma State University's Arts and Sciences Teleconferencing Service. OSU began broadcasting a single semester of German language instruction in January 1985. During the 1986-87 school year, broadcasts were received by 101 districts in six states and offerings had

been expanded to two full years of German and a full year of high school physics. Future course production plans include the broadcast of accredited high school courses in pre-calculus, Russian language, chemistry, etc. Unlike the TI-IN Network, OSU's satellite courses are broadcast either two or three days each week (depending on the course) rather than five. On the non-broadcast days, students work individually at their schools on computer assisted lessons and written assignments which have been specifically designed by OSU educators. Extensive inservice training, K-12 student enrichment programming, and special topic video-conferencing is also provided by the network.

The third largest instructional satellite system is operated by the Utah State Department of Education with support from the IBM Corporation and Bonneville International Corporation. Utah's satellite system is distinctly different from each of the other instructional satellite systems now in operation. Instead of broadcasting live instruction, previously recorded videotapes are beamed to the receive site schools. Furthermore, there is no audio talk-back component to allow students to pick up the telephone and call their TV teacher to ask questions or seek information. Utah's is a "receive only" system which does not allow for interaction between teacher and students. Over 800 students in six states were participating on the network during the 1986-87 school year. Lessons are broadcast every other day. On the non-broadcast days,

students complete individual work assignments on IBM PC Junior microcomputers which include voice synthesis capabilities. Spanish language is the only course offered.

The newest vendor into the high school instructional satellite market is Eastern Washington University located outside Spokane. In conjunction with Education Service District #101, the network began the broadcast of four high school courses to 15 schools in Washington state in the Fall of 1986. The operation of this network most closely parallels the TI-IN Network except that live instruction is beamed to subscribing high schools four days each week rather than five. Inservice training to teachers is also provided.

Statewide Satellite Networks:

The application of satellite technology for interactive television instruction in public schools is still in its infancy. Yet, the rapid growth of these four satellite instructional television networks has spawned great interest by many state school officials as to the feasibility of statewide satellite networks. In Kentucky, the 1986 Legislature, with strong endorsement from the Governor's office, approved plans for a multi-million dollar statewide network that will include an uplink and 1650 downlink dishes. A receive dish will be located at each of the states 1320 elementary and secondary schools as well as at state sponsored vocational schools, libraries, community colleges and universities. The primary thrust for

educational programming will be to elementary and secondary schools. Programming during evening hours will include staff development, college credit instruction, adult education, continuing education, community education, etc. Programming will orginate from Lexington. Educational leaders in Kentucky anticipate that the network will be operational by the Spring of 1989 (Smith, 1987).

In 1987, the Board of Directors of the Missouri State School Boards Association (MSSBA) approved establishment of the Educational Satellite Network (Gardner, 1987). At the time of this writing, 200 downlink dishes had been installed in public secondary and elementary districts across the state. By year end 1989, the MSSBA plans to have installed downlinks at most of the states 545 elementary/secondary districts. The network will operate on a non-profit basis and will broadcast a full range of programming including high school courses, student enrichment, staff development, college credit classes, etc. Uplinking will be from a KU-band mobile unit, thereby allowing programming to originate from virtually any desired location within the state. The base price for districts to participate on the network is about $3500.

Undoubtedly, other states will follow the examples set by Kentucky and Missouri. As existing networks grow and new networks begin beaming instruction, interest across the country -- especially in small and geographically isolated school districts -- is expected to mushroom.

Benefits of Satellite TV Instruction to Rural Schools:

The benefits of live, interactive TV instruction via satellite to rural schools are numerous. The following list was compiled by the Northwest Regional Educational Laboratory wherein researchers indicated the potential benefits of distance education (Batey and Cowell, 1986).

1. Provide equity and increase quality of educational opportunity.

In small or isolated high schools there may not be enough students to support advanced or specialty courses offered by larger or less isolated schools. Additionally, some schools may not be able to supply the resources or qualified staff to offer courses in certain areas such as science, foreign language, or vocational programs. The needs of the homebound student can also be met with a distance program.

2. Provide access to subject matter experts or career role models not available in the local community.

Interactive technologies give students an opportunity to listen to and question individuals located anywhere on the earth. For example, students can converse with an astronaut, an author, a corporate executive, a state or national political figure, a Nobel prize winner, or a representative of a foreign embassy.

3. Provide interaction and joint activities with students in other schools.

Here, the possibilities include simple sharing of everyday information between students in other communities, states, or countries; cooperative units of study between schools; and extended classrooms where a few students at a school become part of a larger classroom pulled from several schools.

4. Provide increased access to information and instructional resources.

. . . a distance learning education system which includes a satellite dish can receive and

temporarily store instructional programming on videocassettes, avoiding the long-term rights, fees, and storage costs of a large video library.

5. Provide opportunities for staff development and inservice training.

With a distance education system in place, school faculty and staff may have access to distance coursework provided by postsecondary institutions or other agencies. Opportunities for staff development can range from single topic discussions or presentations to whole courses or degree programs.

6. Promote increased school/community linkages.

A distance education program can extend to the community by providing credit or noncredit courses. Database access can be extended to interested community members. Community members can serve as resources or [facilitators] in distance educations courses for the school.

Educators in our nation's schools have reason to be excited. Subscribers to interactive satellite instruction are chiefly rural and small schools which are hampered by low student enrollments which increase per pupil cost of programs, facilities, and certified personnel. Satellite technology is a viable approach to bringing educational opportunity to students, faculty, and staff in these schools. The technology is now here to reach out and teach thousands of students via "long distance" whom we have been unable to reach before. This is not to suggest that distance learning via satellite is an educational panacea. Quality instruction by a certified teacher in the classroom is still the ideal way to educate students. Yet in remote and isolated schools where a certified teacher is not always available or in small schools where limited student

enrollments make hiring teachers for low incident courses cost prohibitive, satellite instruction may be the "next best thing to being there."

For futher information contact:

Arts and Sciences Teleconferencing Service
Arts and Sciences Extension
206 Life Sciences East
Oklahoma State University
Stillwater, Oklahoma 74078-0276
Telephone: (405) 624-5647

Instructional Technologies
Utah State Office of Education
250 East 500 South
Salt Lake City, Utah 84111
Telephone: (801) 533-5573

Telecommunications Project
Education Service District #101
West 1025 Indiana
Spokane, Washington 99025
Telephone: (509) 456-7660

TI-IN Network, Inc.
100 East NASA Road
Suite 201
Webster, Texas 77598
Telephone: (713) 554-5545

Arts and Sciences Teleconferencing Service
Arts and Sciences Extension
206 Life Sciences East
Oklahoma State University
Stillwater, Oklahoma 74078-0276
Telephone: (405) 624-5647

Instructional Technologies
Utah State Office of Education
250 East 500 South
Salt Lake City, Utah 84111
Telephone: (801) 533-5573

Telecommunications Project
Education Service District #101
West 1025 Indiana
Spokane, Washington 99025
Telephone: (509) 456-7660

Satellite Project
Kentucky Educational Television
600 Cooper Drive
Lexington, Kentucky 40402
(606) 233-3000

Educational Satellite Network
Missouri School Boards Association
1809 Vandiver Drive, Suite 100
Columbia, Missouri 65202-1983
(314) 474-8591

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